DOCUMENT RESUME

ED 314 776 CS 506 984

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TITLE Redefining Group Cohesiveness and Effectiveness: Replicating and Extending within New Perspectives.
PUB DATE Nov 89
NOTE 26p.; Paper presented at the Annual Meeting of the Speech Communication Association (75th, San Francisco, CA, November, 18-21, 1989).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Communication Research; Group Behavior; Group Dynamics; Group Experience; *Group Unity; Higher Education; *Interpersonal Communication; *Research Methodology; Undergraduate Students
IDENTIFIERS Group Characteristics; *Group Cohesion; SYMLOG Coding System

ABSTRACT

A study examining small group performance replicated and extended a previous study by L. Kelly and R. L. Duran to reanalyze their operationalization of cohesiveness. To test the hypotheses of the original study and to explore questions about using the polarization index as an indication of group cohesiveness, the study used a large number of groups, an additional formula for calculating polarization intensity, two additional measures of group cohesiveness, and an additional evaluation of group output as a measure of group effectiveness. Subjects were students (N=248) enrolled in a multi-section course in small group communications at a large midwestern university. Subjects self-selected themselves into groups of no less than three and no more than seven and participated in five hours of introductory interaction. After this, they were asked to develop and present two exercises on group communication topics. Results revealed that neither polarization nor unification is an adequate measure of group cohesion and that a factor other than cohesiveness accounts for group effectiveness. Findings suggest that group effectiveness is more dependent upon feelings of satisfaction than on feelings of cohesiveness. Continued investigations into individual members of the work group and their definitions of group and personal effectiveness appear to be called for. (Eight tables of data are included; 22 references are attached.) (KEH)

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REDEFINING GROUP COHESIVENESS AND EFFECTIVENESS: REPLICATING AND EXTENDING WITHIN NEW PERSPECTIVES

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The project presented in this paper replicates and extends the work of Kelly and Duran (1985). Their study of the relationship of group member perceptions of group interaction and group effectiveness is re-examined under the several new perspectives that offer new directions for small group research.

CS506984

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REDEFINING GROUP COHESIVENESS AND EFFECTIVENESS: REPLICATING AND EXTENDING WITHIN NEW PERSPECTIVES

Small group research has gone through a considerable amount of change and growth in the last two decades. The seventies and early eighties were marked by a period of epistemic "rough water" while small group researchers searched for the appropriate ways of conceptualizing and approaching research. Theorists (Bormann, 1970; Fisher and Hawes, 1971; Gouran, 1970; and Cragan and Wright, 1980) have been critical of past group research. Criticisms included a concern about the appropriate parameters of research content, questions about the appropriate methodological procedures, and most importantly the fear of a lack of consistent theoretical bases underpinning such research. In a comprehensive review of small group literature of the 80's, Frey (1988) indicates that many of the deficiencies cited about small group research have been addressed in the last nine years, though new questions continue to surface.

A major issue that has been raised recently centers around the notion of whether communication is even an important factor in the group decision making process. "Current work on small group communication reflects the belief that we must study the how of communication influence rather than the if" (Hewes, 1986, p. 288). In this provocative article, Hewes posits that most of the past group research has either failed to provide adequate evidence that communication has any significant effect on group decision making, or at best, that communication serves as a mediator of some other variable(s). This alternative position proposed by Hewes takes on the label socio-egocentric. It assumes that most small group decision outputs can be explained by noninteractive factors.

While Hirokawa (1982) admitted that few previous investigations have succeeded in finding some consistent and meaningful relationships between group interaction variables and group performance outcomes, the majority of scholars have not conceded to Hewes' argument. Researchers still test and measure the relationship of group outcome to group development, consensus, satisfaction, and cohesiveness, areas of focus that Gouran (1973) suggested earlier.

Hirokawa has conducted the bulk of investigation concerning the role of communication on group effectiveness with varying results. He found no significant ties between communication behavior and effectiveness in a 1980 study (Hirokawa, 1980). However, Hirokawa and Pace (1983) found that a

careful evaluation of opinions and assumptions by group members was positively related to group effectiveness. Additionally, the authors found that groups containing influential members who exerted a positive influence over the group by leading them to higher quality decisions had more success than those groups without such leadership. Finally, Hirokawa (1985) discovered that critical communication functions related more to group performance than discussion procedure.

A third approach to explaining small group interaction is the theoretical perspective of structuration (Poole, Seibold, & McPhee, 1986). This general theory developed from the work of Giddens provides a framework that addresses two tensions that result from interaction among group members: 1) tension from the interaction of the individual action and the structural factors in group interaction; and 2) tension from the dialectic of stability and change in group structures. "The theory of structuration mediates tensions between individuals and systems, and between structural stability and emergence" (Poole, Seibold, & McPhee, 1986, p. 264). Initial testing of the structuration theory focused on small group communication has just begun.

Regardless of their perspective, small group researchers continue to be intrigued by the factors that allow a task group to achieve their goal effectively while developing cohesive bonds. Group effectiveness has been measured a number of ways; quality of solution, quantity of ideas, and correctness of solution are most often used. The force that binds group members together has been generically defined as cohesiveness although that construct has drawn a number of different operationalizations and methods of measurement.

These issues drew us to the work of Kelly and Duran (1985a, 1985b). It seemed to us that their study of the relationship of group member perceptions of group interaction and group effectiveness could help us in more specifically operationalizing the effectiveness and cohesiveness constructs. Kelly and Duran (1985a, 1985b) used SYMLOG (A System for the Multiple Level Observation of Groups) Adjective Rating method developed by Bales and Cohen (1979) as the vehicle for measuring member perceptions of group communication.

SYMLOG is a theoretical and methodological system that accounts for and measures group communication behavior on three theoretically orthogonal dimensions: 1) dominant (U=Upward) to submissiveness (D=Downward); 2)

friendly (P=Positive) to unfriendly (N=Negative); and 3) instrumentally controlled (F=Forward) to emotionally expressive (B=Backward). These or similar dimensions have been extracted and validated by other researchers (Isenberg & Ennis, 1981; Solomon, 1981; and Wish, D'Andrade, & Goodnow, 1980).

The SYMLOG method allows members to rate their perceptions of their own interaction behavior and that of other group members on the three dimensions. The results of the group members ratings are averaged across the group to allow a visual image of the group to be plotted in the three dimensional SYMLOG space (group average field diagram).

The purpose of our project was to: 1) replicate and extend the Kelly and Duran (1985a, 1985b) study; and 2) reanalyze their operationalization of cohesiveness. They indicate that their work was largely descriptive due to a small sample size. To replicate and extend, our study must incorporate a large number of groups, and include additional tests of cohesiveness. It is our contention that cohesion is not adequately operationalized in their study.

The Kelly and Duran (1985a, 1985b) study measured subjects' perceptions and performance in two consecutive group task projects. Grades assigned for each of the projects served as a measure of group effectiveness. The SYMLOG Adjective Rating Forms were used to measure the group members' perceptions of their interaction while preparing for their projects. The authors focused their study on two factors: group cohesion and group leadership. The authors defined cohesion as the extent to which perceptions of members' behavior clustered together in the three-dimensional SYMLOG space. Group averaged ratings that produced similar scores for all members were taken as an indication of group cohesion; those that resulted in dissimilar scores were taken as an indication that a group lacked cohesiveness. This level of cohesion was measured by a formula that computed the average Euclidean distance between member plotting scores on each of the three dimensions. The distance is labeled as the polarization score. In this case, polarization is not the phenomenon of risky shift. Rather, polarization is the degree to which group members perceive their interaction being similar on the three SYMLOG dimensions. A low polarization score indicates that group members perceive themselves interacting in similar fashion. A high polarization score indicates that the group members perceive themselves as behaving differently in the

interaction. Kelly and Duran believe this score reflects the level of cohesiveness within the group.

Kelly and Duran (1985a, 1985b) made additional use of the SYMLOG plotting locations by visually examining each group average field diagram for evidence that a task leader existed. Leadership was assumed to be exhibited when one member of the group rated higher in task orientation (instrumentally controlled) than other group members. In the one representative example provided, the task leader was also more dominant than most of the other group members.

Analysis of the data lead Kelly and Duran to draw a number of conclusions. Effective groups produced a SYMLOG configuration that indicated a moderate degree of cohesiveness, relatively equal participation of members, and a clear task leader. Groups that were less effective appeared to be associated with the lack of a task leader and one of two patterns of cohesiveness. These groups had either a high degree of cohesiveness (polarization distance scores of 3.5 or under) or low cohesiveness (polarization distance scores of 6.0 or higher). The authors reasoned that groups without discernible task leaders might get side-tracked onto emotional or social issues at the expense of critical evaluation of ideas. They also posit that groups that are highly cohesive may be reluctant to express disagreement or analyze ideas critically, while groups lacking cohesion might be diverted from the task because of frequent disagreements. Each of these factors might explain a lower degree of effectiveness.

Hypotheses

The Kelly and Duran (1985a, 1985b) project sought to find a group interaction variable that was related to effective group performance. Examining group members' perceptions of group interaction with SYMLOG was an attempt to identify configurations of group interaction that were distinguishable from one another. The results of their study suggested "that effective and ineffective groups can be distinguished on the basis of members' perceptions of one another on the SYMLOG dimensions" (Kelly & Duran, 1985a, p. 190). Conclusions from their study can be recast as hypotheses about group interaction and its effect on group effectiveness. The hypotheses are:

> H1: Highly effective groups are characterized by the presence of an identifiable task leader and moderate SYMLOG polarization indices (3.5 to 6.0).

H2: Ineffective groups are characterized two ways:

a) Strong cohesiveness with little variation among members on SYMLOG dimensions (that is, SYMLOG polarization indices of less than 3.5), and no identifiable task leader;

or

b) Strong coalition formation as described by SYMLOG polarization indices (greater than 6.0), and no identifiable task leader.

A major limitation to the Kelly and Duran project is the small sample of groups used (n=8). Our interest is their operationalization of the cohesiveness variable as the SYMLOG polarization index. Our study is in essence a replication and extension of the Kelly and Duran project. To help us test Kelly and Duran's hypotheses and to explore our questions about using the polarization index as an indication of group cohesiveness, we used a large number of groups (47), an additional formula for calculating polarization intensity, two additional measures of group cohesiveness, and an additional evaluation of group output as a measure of group effectiveness.

Methodology

Subjects

Individuals who compose the groups for this study were students enrolled in a multi-section course in small group communication at a large midwestern university. The sections were standardized through the use of common syllabi, lectures, testing, and group presentation evaluation criteria. The course syllabus clearly stated that group work was part of the class assignment and course grade. These course characteristics are similar to those of the Kelly and Duran project.

Students (n=248) represented many disciplines, and the traditional college ages (18-22), although a few nontraditional age students were interspersed throughout these classes. Females dominated the female-to-male balance by approximately two to one. Within each of the ten sections, students self-selected themselves into groups (n=47) of no less than three and no more than seven members. Subjects received extra credit toward their overall course grade for their involvement.

Prior to self-selection, subjects participated in five hours of introductory interaction. This allowed students to become acquainted and familiar with one another before choosing group members and to become accustomed to working in task oriented groups. Typical of these activities were small group and individual introduction exercises, group production

and problem solving tasks, and exercises in which personal values, attitudes, and interests were expressed. There was no attempt to control for age, sex, background, personality variables, or communication characteristics other than what the subjects imposed upon themselves as their own selection criteria. We believe that self-selection promotes subject involvement and interest in group projects and represents reality better than random assignment procedures. Of course, some trade-off in generalization of results is made; the large number of groups partially offsets that limitation.

In the Kelly and Duran project, 23 student subjects were placed into eight groups on the basis of availability of free time to meet outside of class and an attempt to equalize gender. Groups had either four or five members.

Group Task

Our groups formed to develop and present two presentations on group communication topics. As an aid to that task, groups were given 13 class periods to meet. Groups met seven times in class before making the first presentation and an additional six times to prepare for the second.

The group task in the Kelly and Duran project was also a two-part assignment to permanently formed groups. Their first assignment was a solution production assignment following a standard procedure for group problem solving; the output of the problem solving sessions were oral and written reports. The second assignment was a decision making assignment again following a standard procedure; the output was similar to the first. Although the group tasks for our project differ slightly, these groups also had to make an oral presentation and, certainly, the process for coming to consensus about how to do that included both group decision making and group problem solving.

In this project, three of the 13 in-class work sessions were selected for data collection. The first data session occurred at the second meeting (week 2-3) of the group. (The first group meetings were not used because our experience with these type of groups has shown that the first meeting is primarily orientation in nature with very little attention to decision making and problem solving.) The second data session was the meeting just prior to giving the first presentation (week 4-5). The third data session was in the middle of the groups' preparation for the second presentation (week 7-8). Although this project captures data at three times, the data

collected at times 2 and 3 are representative of the data collected in the Kelly and Duran project at times 1 and 2. Measuring instruments were administered immediately after the group meetings. Data were collected before group members made their presentations and before they received grades for the projects.

The Kelly and Duran groups were formed the second week of the semester. The first project was assigned the third week and completed by the sixth. The second group project was assigned the seventh week and completed the tenth. Data was collected for both phases the week following completion of the written and oral projects. Thus, their subjects were likely to have experienced several meetings and collapsed their perceptions about those meetings into the one data collection phase.

Like the Kelly and Duran groups, each group project was given a grade by the instructor. While the Kelly and Duran groups (n=8) received grades from the same instructor, here seven instructors were involved due to the large number of groups (n=47) included in the study. In both studies, the same group grade was given to each group member. Kelly and Duran looked for consistencies between grading periods to assign groups to effectiveness categories. Rather than assume that effectiveness (operationalized as a grade) is a static construct, we chose to analyze the data at both evaluation points. In addition to the group grade given by the instructor, the final group presentation was evaluated on four additional criteria by their instructor and two other section instructors.

Variable Definitions and Measures

SYMLOG

As in the Kelly and Duran project, the SYMLOG self-report Adjective Rating Form (Bales & Cohen, 1979) was used to capture group members' perceptions about their communication behavior and the communication behavior of the other group members in the group meetings. Twenty-six adjective phrases represent each single dimension, and the double and triple dimension permutations of: 1) dominant-submissive (U-D); 2) friendly-unfriendly (P-N); and 3) task oriented-emotionally expressive (F-B). Subjects respond to the adjective phrases using a 3 point scale (0=never or seldom, 1=sometimes, and 2=often or always). Subjects completed the rating form after each of the three data sessions.

SYMLOG positions are computed for each individual group member

according to procedures detailed in Bales and Cohen (1979). The individual ratings are averaged within the group to produce a group index of perceptions about the interaction behavior in the group. The SYMLOG positions are also used to calculate the average Euclidean distance or the polarization index for each group. The formula [SQRT (((U-D) of group member A-(U-D) of group member B)^2+((P-N) of A-(P-N) of B)^2+((F-B) of A-(F-B) of B)^2)] is calculated for each pair of group members. These are summed and divided by N(N-1)/2 where N equals the number of group members to allow comparisons across groups. The formula was also used in the Kelly and Duran project. It is one of Polley's reconfiguration of the original polarization formula (Polley, 1985). Table 1 presents the range of polarization indices for the groups in this project. The polarization index has been reconfigured as a unification index (Polley, 1989); we also calculated this for each group. The unification index is based on the P-N and F-B dimensions. Interpretation of the unification index is just opposite of the polarization index: a high unification score indicates a highly cohesive group while a low unification score indicates a widely diverse group. These indices are shown in Table 2.

insert Table 1 here

insert Table 2 here

Cohesion

To confirm that the SYMLOG polarization index was indeed an indication of cohesiveness, two additional measuring instruments were used. Many definitions and measures of cohesiveness exist; two independent and alternative conceptualizations were chosen. The first is the 20 item Group Attitude Scale (Evans & Jarvis, 1986) which measures attraction to group interms of identifying with and being accepted by the group. The second is the 18 item Wheeless Solidarity Scale (Wheeless, Wheeless, & Dickson-Markman, 1982). These researchers define solidarity as similarity in expressions of sentiment, behavior, and symbols.

These two instruments were administered immediately after each of the data sessions with the SYMLOG Adjective Rating Forms. The individual internal reliabilities for these two instruments were quite high, ranging from .888 to .957. To compute a group index on these measures, the scores

for individuals within a group were averaged. The group summary statistics are shown in Table 3.

insert Table 3 here

Although the two measures emphasized different factors of cohesiveness, the measures were expected to be correlated. The group level Pearson product moment correlation was .902 at the second measurement and .863 at the third.

Group Effectiveness

The grades for the group presentations were given by the course instructors based on jointly developed grading criteria. Students had knowledge of these criteria while preparing their presentations. These criteria were designed to evaluate the group's output (the presentation), not the group's interaction leading up to the presentation. Subjects evaluated their meeting interaction using the SYMLOG measures. Grades were given on a 10-point scale ranging from excellent (10) to failure (0). Summary statistics for group grades are presented in Table 3.

A separate and additional evaluation of the final presentation was made by the instructor and two other section instructors. The criteria were: 1) clarity--the extent to which objectives were clear and met by the group; 2) usefulness--the extent to which the material was of value for future reference in the small group communication context; 3) creativity--the extent to which the material was presented in a dynamic, interesting, and stimulating manner; and 4) audience involvement--the extent to which the group presentation stimulated audience interest and involvement. This additional evaluation was made independent of the group grade. Subjects did not receive these evaluations; these evaluations were not used in forming a grade for the final presentation. Each of the four criteria were judged on a scale of one through seven to indicate unacceptable to exceptional quality. The inter-coder reliability for this measure was .865. This additional group effectiveness measure was labeled External Evaluation; summary statistics are shown in Table 3.

Results

First Analysis

Because this project is a replication and extension of a previous study and because we were particularly interested in the operationalization

of cohesiveness, we began by testing those portions of the hypotheses suggested by Kelly and Duran. The 47 groups were divided into high (greater than 6.0), moderate (3.5 to 6.0), and low (less than 3.5) categories based on each group's polarization index. At time 2 (similar to Kelly & Duran's time 1), there were 15 high, 24 moderate, and 8 low groups. At time 3 (similar to Kelly & Duran's time 2), there were 15 high, 26 moderate, and 6 low groups. The summary statistics for the group variables for each of the breakdowns are shown for in Table 4.

insert Table 4 here

Using Kelly and Duran's three level categorization of polarization scores and a weighting factor to account for the differing group n's, regressions at the group level of analysis were computed within each of the three levels to see if group effectiveness (group grade or external evaluation) could be predicted by the polarization score. No significance was indicated at time 2.

At time 3, there was one significant finding. For the six groups with low polarization scores (3.5 or below) and classified as too cohesive and ineffective, the final group grade (mean=7.0) was predicted by the polarization score ($F=7.63$, $p=.05$, $df=1,4$, $r^2=.656$). Kelly and Duran suggest that low polarized groups are ineffective because they are overly cohesive. The average grade of these six groups was a B which reflects the average of all 47 groups; we do not consider grades in this range to be a demonstration of group ineffectiveness.

Second Analysis

Because our sample represented a much broader range of polarization scores than the Kelly and Duran groups, we generated a new breakdown of polarization scores by categorizing polarization scores as: 1) greater than the mean polarization plus one-half standard deviation (high polarization); 2) within the range one-half standard deviation above and below the mean (moderate polarization); and 3) less than the mean polarization minus one-half standard deviation (low polarization). (See Table 1 for these breakdowns.) At time 2, this resulted in 6 high, 34 moderate, and 7 low groups. At time 3, this resulted in 5 high, 37 moderate, and 5 low groups. The summary statistics for the group variables for each breakdown are shown in Table 5.

insert Table 5 here

Using the polarization levels as categories and the weighting factor, regressions were computed within category levels to test the ability of the polarization score to predict group effectiveness (group grade and external evaluation). No significance was found.

A second series of regressions were computed to include all of the 47 groups without respect to any categorization on the polarization score. Polarization did not predict group grade at time 2 nor group grade or external evaluation at time 3.

The results of the first two analyses indicated that the polarization categorizes defined by Kelly and Duran or the similar categorizes suggested by our data were not fruitful. Thus, the operationalization of group cohesiveness using the polarization index was not useful. We turned to the alternative formulations of cohesiveness--the unification index and the measures of group attitude and solidarity for the third and fourth analyses.

Third Analysis

This third set of regressions is a repetition of the first analysis; this time we used the unification index as the predictor of group effectiveness (group grade or external evaluation). Like Kelly and Duran's levels of polarization, we calculated three levels of unification: 1) highly unified groups--scores one-half standard deviation above the mean or higher; 2) low unified groups--scores one-half standard deviation below the mean or lower; and 3) moderately unified groups--scores between the paramaters of the other two. At time 2 this breakdown resulted in 21 high, 9 low, and 17 moderate groups. At time 3, there were 23 high, 12 low, and 12 moderate groups. The summary statistics for the group variables for each breakdown on are shown in Table 6.

insert Table 6 here

Within these categories, regressions weighted by the number of members of the group were computed at the group level of analysis to test the ability of the unification index to predict either group grade or external evaluation. There were no significant findings. A second series of regressions were ran on all 47 groups regardless of their unification

level; again, there were no significant findings.

Fourth Analysis

In this series of regressions, we repeated every regression ran in the other three regression series. Rather than using a SYMLOG index (polarization or unification) of cohesiveness, we used the group means of the two questionnaire measures of group cohesiveness--group attitude and solidarity--to predict group effectivness (group grade or external evaluation). We ran these regressions at the group level using a weighting factor to account for the varying size of groups (1) within the Kelly and Duran categorization levels, (2) within the categorization levels suggested by our data, and (3) on all groups without regard to categorization level using first the group attitude measure of cohesiveness, and then the solidarity measure of cohesiveness. There was only one significant finding.

For the 15 groups categorized as having moderate polarization scores at time 3 according to Kelly and Duran's classifications, the solidarity measure predicted the external evaluation score ($F=4.45$, $p=.05$, $df=1,13$, $r^2=.255$). For these groups the mean external evaluation was 47.188 which reflects the mean of the 47 groups; Kelly and Duran hypothesized that groups with moderate polarization scores would be highly effective. We do not consider the average external evaluation of these 15 groups to reflect that degree of effectiveness.

Fifth Analysis

At this point, we were suspect of the assumed relationship between group effectiveness and group cohesiveness. Now we wanted to explore the relationship among the four operationalizations of cohesiveness--polarization, unification, group attitude, and solidarity. We wanted to believe that the SYMLOG indices of cohesiveness (polarization and unification) were stronger measures of that construct because they result from group member responses to the phrases of the Adjective Rating Form. In these phrases, members rate how they perceive themselves and the other group members interacting in the group meetings. In other words, there is no direct reference to group cohesiveness. On the other hand, it is likely that even naive subjects would guess that the two questionnaires were measures of group cohesion. This face recognition may inflate subject responses due to a social acceptability bias. Thus, without regard to any breakdown, we ran regressions first to test the ability of the polarization

score to predict group attitude and then solidarity.

The group polarization index did predict group attitude and group solidarity at both points of data collection. Similarly, the unification index made similar predictions. These are reported in Table 7. And, finally, we wanted to look at the relationship between polarization and unification. This significant relationship is also reported in Table 7.

insert Table 7 about here

It appears then that the measures of cohesiveness--polarization, unification, group attitude, and solidarity--do in fact measure group cohesiveness at least as operationalized by the others.

Sixth Analysis

If group cohesiveness does not predict group effectiveness, is there another variable that will? Having the opportunity to collect data from 47 groups over a period of ten weeks, we collected data on other variables to extend this replication. Like cohesion, satisfaction is an outcome that results from group interaction. And often, the two variables are perceived to be related. If a group is cohesive, it is expected that group members will also be satisfied (Shaw, 1981).

A line of research that measures individual group member satisfaction has been conducted by Wall and his colleagues (Wall & Galanes, 1986; Wall, Galanes, & Love, 1987; Wall & Nolan, 1986; and Wall & Nolan, 1987). Their 10 item Likert-type self-report measure for student task groups includes both process and product related items.

The Wall measure of group member satisfaction is the only instrument that measures this construct from the group context. The Hecht (1978b) Com-Sat Inventory measures interpersonal satisfaction from the dyadic context. Other measures of group satisfaction include the larger organizational context (i.e., workplace factors that are inappropriate for this sample). The Wall satisfaction instrument was administered with the other measuring instruments immediately after the data session meetings. Internal reliabilities at the individual level of measurement were in the low 90's. Scores for individuals in a group were averaged together to provide a group index. The summary statistics for the group level variable are shown in Table 8.

insert Table 8 about here

Without regard to any level of polarization or unification, we ran a series of regressions at the group level of anlaysis to see if satisfaction rather than cohesiveness would predict group effectiveness. For the final evaluation period, group mean satisfaction did predict group grade ($F=7.16$, $p=.01$, $df=1,45$, $r^2=.137$) and external evaluation ($F=4.31$, $p=.04$, $df=1,45$, $r^2=.087$). Although significant, little variance is explained by the satisfaction variable.

Discussion

These results indicate that Kelly and Duran's expectations as well as ours for predicting group effectiveness from cohesiveness constructs may be premature or misguided. Certainly working with a small number of groups inhibited Kelly and Duran's efforts. Replicating their study with a larger sample and alternative operationalizations of cohesiveness, we still failed to find the relationship we assumed was there. Thus, we feel secure in rejecting the hypotheses generated from the Kelly and Duran conclusions and in suggesting that a factor other than cohesiveness accounts for group effectiveness.

A limitation for both studies is that the population was students. However, we believe that this limitation was overcome by a research design that captured data from the overall group process and that the task had outcome consequences for the subjects in terms of a shared group grade, and, maybe more importantly, the task also had process consequence. These groups were full-fledged groups in that group members interacted and were dependent on one another to produce a group outcome for which members share a common fate. This task assignment is similar to that of many organizational groups which must interact in a series of problem solving sessions and make many decisions before being able to present their final product. In a sense, these groups were formed within a larger organizational context as groups competed for resources (grades), had established time parameters, and had to deal with intra-group and inter-group politics. These factors create real-world pressures. We believe groups like these meet the criteria suggested by Poole (1983): groups should not be zero-history, there should be incentives for group members to maintain solidarity, there should be pressure to finish the task, and the task should have some complexity.

It is disappointing that the output measures did not perform better as measures of group effectiveness. To us this suggests a lack of parallelism between internal group processes and externally judged outcome effectiveness. A group may feel that they have performed effectively even though their results are judged to be ineffective by others. Or, a group's output may be judged by others to be superior when the group is less than pleased with their performance or the group interaction leading to the final output.

The most important finding of this project is to reject the cohesiveness construct defined by the SYMLOG polarization index which measures similarity on all of the dimensions of the SYMLOG space. Polley's more recent unification index measuring similarity on the P-N and F-B dimensions appears to be better related to cohesivness. However, we believe that even the unification index is only an adequate indicator of group cohesion if the group is located in the PF or possibly the PB quadrant. Let's examine group interaction judged to be in the NF or NB quadrants. While interaction is being perceived similarly, this type of interaction would be detrimental to cohesion. If four people were meeting as a group and a conflict erupted, they would likely rate themselves as uniformly dominant, negative, and emotionally expressive (UNB) in SYMLOG terms. By Kelly and Duran's definition and Polley's unification index they would be cohesive because they perceived themselves similarly. Tying cohesion to polarization or unification does not account for where in SYMLOG space the similarity occurs. We believe that the polarization and unification indices are better referred to a measures of perceptions of like-behavior. This difficulty in operationalization points to the need for re-examining the behaviors considered to be part of a cohesiveness factor.

The many analyses here point to group effectiveness being more dependent upon feelings of satisfaction rather than feelings of cohesiveness. Hecht (1978c) defines satisfaction as an internal reinforcer that is grounded in communication behavior based upon expectation fulfillment (Hecht, 1978a). We believe that Hecht's definitional focus is on target, but he provides no methodology for measuring the satisfaction construct within a group setting. Relying on the Wall et al. satisfaction instrument relinquishes the definition of group member satisfaction to an analysis of the items contained in the instrument.

A succinct definition is never explicitly given; but one can be derived. Wall and his colleagues envision group member satisfaction as a bipolar scale of satisfaction-dissatisfaction. Satisfaction is anchored by positive feelings about group performance, recognition of the quality of the group output, positive feelings about the group work, and positive feelings for the other group members. Methodologically, dissatisfaction is the absence of satisfaction. Item definitions are anchored in feelings of personal ideas being stifled, low enthusiasm, resentment toward being in a group an individual does not want to be in, and frustration. Here, satisfaction and dissatisfaction are emotional responses to the group's interaction or the results of the group interaction and deal with expectation fulfillment.

How satisfying interaction is specifically characterized by the SYMLOG dimensions needs more exploration. Wall and Galanes (1986) report that the P-N dimension was significantly linked to satisfaction when they hypothesized that satisfaction would be positively related to F as well. It is logical to expect that members of task-oriented groups would feel satisfied as they accomplished group tasks. A more thorough investigation of the satisfaction construct in the group context is required.

The leadership proposition that Kelly and Duran propose as tandem to their cohesiveness proposition was given little attention by us since we did not replicate their findings about cohesiveness. In these groups, the emergence of a clear task leader was as evident in the high and low polarized (ineffective according to Kelly and Duran) groups as in the more effective moderately polarized groups. Our tracking of the task leaders that emerged through to the final evaluation suggests that task leaders are not stable roles. Some groups had members who switched on and off being task leader; some groups established a task leader some of the time; some groups had multiple task leaders; and, finally, some groups never established a task leader in the many weeks of interaction. This requires further investigation since SYMLOG researchers (Koenigs & Cowen, 1988) have established an ideal location in SYMLOG space for the "most effective leader". Few of these groups had a group member who could be identified as a task leader according to their criterion.

Conclusions and Implications

We had hoped our results would allow us to make a connection between our work and the structuration approach. We thought structuration would be

fruitful since both measures of group satisfaction and group cohesiveness help us understand how group members are reacting to the influences of decisions made in their groups. Poole, Seibold, and McPhee (1986) indicate that "because causal determinations are mediated by members' consciousness to understand how structural features or unintended consequences influence decision-making, it is necessary to understand how these are enacted and understood by members" (p. 283). In this study, the sought link did not appear. Changes in group member perceptions on these constructs should lead us to an identification of how interaction structure changes and provides rules for interaction. The one thing that did support the structurational approach was the variability in the identities of the task leaders.

With respect to Hewes' alternative theory that communication does not make a difference in the group context, we can only say that this data does not dramatically reinforce the opposite. These data open enough questions for us that we believe further investigation of the socio-egocentric model is warranted.

Beyond rejecting the expectation that either polarization or unification is an adequate measure of group cohesion, we believe that these data and results lend themselves this one final conclusion. Small group researchers seem tied to research that attempts to predict group effectiveness. Like many other studies, the definitional focus of effectiveness as a dependent variable may be at issue here. A critical viewpoint raised by Schwartzman (1986) is that researchers have imposed their own criteria of work group effectiveness onto the groups they have studied. Studies like this one indicate that researchers should ask members of a work group about their view of what constitutes work as well as effectiveness. As researchers, we may have positioned ourselves too far from actual group process and product. Researchers have counted for quantity, judged for quality, and yet still have not clearly identified effectiveness. The next generation of group effectiveness research may be enhanced by asking group members to define group and personal effectiveness. Perhaps we have been too long in assuming that external observation and measurement can determine what makes a fulfilling group experience.

TABLE 1

Summary of Polarization Indices

Polarization Index	Mean	S.D.	Minimum	Maximum
Time 2	5.357	4.149	1.495	10.563
Time 3	5.257	4.600	1.663	11.594

n = 47 groups

Polarization Categories	Low	Moderate	High
Time 2	< 3.282 (n=6*)	3.282 to 7.432 (n=34)	> 7.432 (n=7)
Time 3	< 2.957 (n=5)	2.957 to 7.557 (n=37)	> 7.557 (n=5)

*groups

TABLE 2

Summary of Unification Indices

Unification Index	Mean	S.D.	Minimum	Maximum
Time 2	93.515	8.102	69.038	100.00
Time 3	92.595	9.906	64.352	100.00

n = 47 groups

TABLE 3

Summary of Group Variables

Variable (Meeting)	Mean	S.D.	Minimum	Maximum
Group Attitude (2)	111.541	10.206	88.600	131.250
Group Attitude (3)	108.982	10.495	82.800	136.750
Solidarity (2)	63.104	8.491	42.167	76.200
Solidarity (3)	64.200	8.590	37.000	81.500
Grade (2)	6.532	1.600	2.000	10.000
Grade (3)	7.064	2.026	2.000	10.000
External Evaluation (3)	47.681	13.650	21.000	77.000

n = 47 groups

TABLE 4

Group Summaries at Time 2 and Time 3
Based on Kelly and Duran's Categories of Polarization

Variable	Mean	S.D.	Minimum	Maximum
High Polarization Index at Time 2				
Solidarity	57.491	8.447	42.167	70.333
Group Attitude	106.158	9.366	90.000	120.000
Midterm Grade	6.667	1.915	2.000	10.000
n = 15 groups				
Moderate Polarization Index at Time 2				
Solidarity	65.452	7.199	48.500	74.750
Group Attitude	114.046	9.065	100.250	131.250
Midterm Grade	6.625	1.408	4.000	10.000
n = 24 groups				
Low Polarization Index at Time 2				
Solidarity	66.583	7.778	50.400	76.200
Group Attitude	114.123	12.152	88.600	128.600
Midterm Grade	6.000	1.604	3.000	8.000
n = 8 groups				
High Polarization Index at Time 3				
Solidarity	59.810	9.022	37.000	72.000
Group Attitude	104.206	10.379	82.800	118.000
Final Grade	7.333	1.799	4.000	10.000
External Evaluation	47.133	12.455	21.000	65.000
n = 15 groups				
Moderate Polarization Index at Time 3				
Solidarity	66.054	8.136	49.000	81.500
Group Attitude	111.172	10.556	91.800	136.750
Final Grade	6.923	2.296	2.000	10.000
External Evaluation	49.000	14.386	23.000	77.000
n = 26 groups				
Low Polarization Index at Time 3				
Solidarity	67.139	5.887	61.333	76.000
Group Attitude	111.431	17.352	106.333	125.667
Final Grade	7.000	1.414	5.000	9.000
External Evaluation	43.333	14.569	24.000	58.000
n = 6 groups				

TABLE 5

Group Summaries at Time 2 and Time 3
Based on Alternative Categories of Polarization

Variable	Mean	S.D.	Minimum	Maximum
High Polarization Index at Time 2				
Solidarity	55.075	10.331	42.167	70.333
Group Attitude	104.950	9.886	90.000	120.000
Midterm Grade	6.500	2.429	2.000	9.000
n = 6 groups				
Moderate Polarization Index at Time 2				
Solidarity	64.088	7.812	45.800	76.200
Group Attitude	112.599	9.858	91.200	131.250
Midterm Grade	6.676	1.430	4.000	10.000
n = 34 groups				
Low Polarization Index at Time 2				
Solidarity	65.210	7.278	50.400	71.400
Group Attitude	112.055	11.505	88.600	123.000
Midterm Grade	5.857	1.676	3.000	8.000
n = 7 groups				
High Polarization Index at Time 3				
Solidarity	59.303	7.314	53.667	72.000
Group Attitude	101.653	11.743	86.667	117.250
Final Grade	7.200	1.643	6.000	10.000
External Evaluation	39.000	11.045	21.000	48.000
n = 5 groups				
Moderate Polarization Index at Time 3				
Solidarity	64.494	8.901	37.000	81.500
Group Attitude	109.634	10.453	82.800	136.750
Final Grade	7.000	2.186	2.000	10.000
External Evaluation	48.919	13.979	23.000	77.000
n = 37 groups				
Low Polarization Index at Time 3				
Solidarity	66.917	6.553	61.333	76.000
Group Attitude	111.267	8.208	106.333	125.667
Final Grade	7.400	1.414	6.000	9.000
External Evaluation	47.200	12.378	28.000	58.000
n = 5 groups				

TABLE 6

Group Summaries at Time 2 and Time 3
Based on Categories of Unification

Variable	Mean	S.D.	Minimum	Maximum
High Unification Index at Time 2				
Solidarity	66.633	6.824	48.500	76.200
Group Attitude	115.928	8.417	100.250	131.250
Midterm Grade	6.571	1.502	3.000	10.000
n = 21 groups				
Moderate Unification Index at Time 2				
Solidarity	61.038	7.645	45.800	72.600
Group Attitude	107.671	9.603	88.600	126.000
Midterm Grade	6.471	1.586	4.000	10.000
n = 17 groups				
Low Unification Index at Time 2				
Solidarity	58.772	10.879	42.167	71.400
Group Attitude	108.617	12.052	90.000	127.600
Midterm Grade	6.556	2.007	2.000	9.000
n = 9 groups				
High Unification Index at Time 3				
Solidarity	67.352	6.837	57.600	81.500
Group Attitude	112.475	9.283	99.250	136.750
Final Grade	6.522	2.294	2.000	9.000
External Evaluation	44.348	13.826	23.000	66.000
n = 23 groups				
Moderate Unification Index at Time 3				
Solidarity	64.026	8.120	49.000	74.667
Group Attitude	107.942	10.212	91.800	125.400
Final Grade	8.250	1.215	6.000	10.000
External Evaluation	57.600	10.492	42.000	77.000
n = 12 groups				
Low Unification Index at Time 3				
Solidarity	58.331	9.546	37.000	72.000
Group Attitude	103.327	11.064	82.800	118.000
Final Grade	7.000	1.730	4.000	10.000
External Evaluation	42.250	12.061	21.000	62.000
n = 12 groups				

TABLE 7

Comparisons of Cohesiveness Measures

Variable	predicts	F	p	R^2
	Time 2			
Polarization	Group Attitude	5.94	.0189	.1165
Polarization	Solidarity	10.92	.0019	.1956
Unification	Group Attitude	6.90	.0118	.1329
Unification	Solidarity	13.58	.0006	.2318
Polarization	Unification	24.92	.0001	.3564
	Time 3			
Polarization	Group Attitude	5.76	.0206	.1135
Polarization	Solidarity	5.15	.0280	.1028
Unification	Group Attitude	7.37	.0094	.1407
Unification	Solidarity	8.70	.0050	.1621
Polarization	Unification	91.32	.0001	.6699

df=1,45 n=47 groups

TABLE 8

Satisfaction Variable Summary Statistics

Satisfaction	Mean	S.D.	Minimum	Maximum
Time 2	51.274	6.413	36.000	63.750
Time 3	49.816	6.987	27.200	66.250

n=47 groups

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